THE EFFECT OF VARIED CROP PROPORTIONS AND SOIL N-LEVELS IN A MAIZE/BEAN INTERCROP: GROWTH MORPHOLOGICAL CHANGES.

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Introduction

Willey (1979) pointed out that the objective of proper crop selection was to reduce intercrop competition, and maximize complementary effects between the different intercrop components in order to increase yield. But benefits may be attained if crop mixtures are morphologically and physiologically of contrasting habits (Baker, 1979).

Materials and methods

A field experiment was carried out in East Ithaca (Cornell University, New York) in 1990 and 1991 growing seasons to determine effects of intercrop proportions of beans and maize and N levels on bean and maize growth morphological changes. The N levels were 0, 80 and 160 kg N/ha. The five crop proportions were sole maize, sole beans, 75% maize + 25% beans, 50% maize + 50% beans, and 25% maize + 75% beans in replacement series. Maize cultivar Pioneer 3925 was spaced at 90cm x 30cm. Bean cultivar Ruddy (determinate, bush) was planted at 60cm x 10cm, 15cm from maize row on either side. Each plot was 8m x 4.5m. Number of days to 50% tasseling in maize, days to 50% flowering in beans and days to maturity of the two crops were recorded.

Results/Discussion

Sole maize tasseled and matured much earlier than intercropped maize in both years (Table 1). As maize proportion was reduced, tasseling and maturity in maize were delayed. This could have been due to early interspecific competition in maize/bean intercrop compared to intraspecific competition in sole maize. There was no significant effect of crop proportions on bean flowering and maturity.

N application resulted in earlier tasseling in maize (Table 2). Intercropping subjected the maize to competition for the available N thus slowing maize growth. Bean vegetative growth was greater and maturity, as indicated by drying of the pods, was delayed with higher N rates (Table 2) although 1991 weather was much drier than the 1990 weather. Wahua (1983) noted that competition for nutrients between legumes and cereal intercrops may delay development and productivity. But here beans and maize yield components and LERs (Land Equivalent Ratios) were higher in intercrops than sole crops indicating a more efficient distribution of resources within

intercrops than sole crops (data not included).

Table 1: The effect of crop proportions on the number of days to tasseling and maturity in maize under sole and intercrop systems.

Maize proportions	1990		1991	
	Tasseling	Maturity	Tasseling	Maturity
25%	55.9 d	107.7 b	52.7 b	92.8 c
50%	54.8 c	106.8 b	---	---
75%	53.8 b	100.8 a	52.9 b	88.3 b
Sole maize	51.9 a	103.4 a	50.7 a	84.8 a
Linear	***	***	***	***
Quadratic	*	ns	ns	ns

Means followed by a common letter are not significantly different at 5% level using LSD.
***, *, ns Significant at 0.1%, 5% or not significant respectively.

Table 2: The effect of N fertilization on days to tasseling in maize and maturity in beans in sole and intercrop systems.

Nitrogen Kg/ha	1990		1991	
	Maize tasseling	Bean maturity	Maize tasseling	Bean maturity
0	55.7 b	80.3 a	53.0 b	71.4 a
80	53.7 a	83.9 b	52.5 ab	78.3 b
160	52.9 a	86.5 b	51.4 a	84.2 c
Linear	***	**	*	***

Means followed by a common letter are not significantly different at 5% level using LSD.
***, **, * Significant at 0.1%, 1%, 5% respectively.

References

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